

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 September 2005 (15.09.2005)

PCT

(10) International Publication Number
WO 2005/085772 A1

(51) International Patent Classification⁷: **G01F 1/00,**
1/80, 1/88

560003 (IN). **HOLMBERG, Mikael** [FI/FI]; Kaivurinkuja
8, FI-06450 Porvoo (FI). **SALMINEN, Asko** [FI/FI]; Huh-
takoukku 16 J 18, FI-02430 Espoo (FI).

(21) International Application Number:
PCT/FI2005/000134

(74) Agent: **BERGGREN OY AB**; P.O. Box 16 (Jaakonkatu 3
A), FI-00101 Helsinki (FI).

(22) International Filing Date: 4 March 2005 (04.03.2005)

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,
ZM, ZW.

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:
20040351 4 March 2004 (04.03.2004) FI

(71) Applicant (for all designated States except US): **ABB OY**
[FI/FI]; Strömbergintie 1, FI-00380 Helsinki (FI).

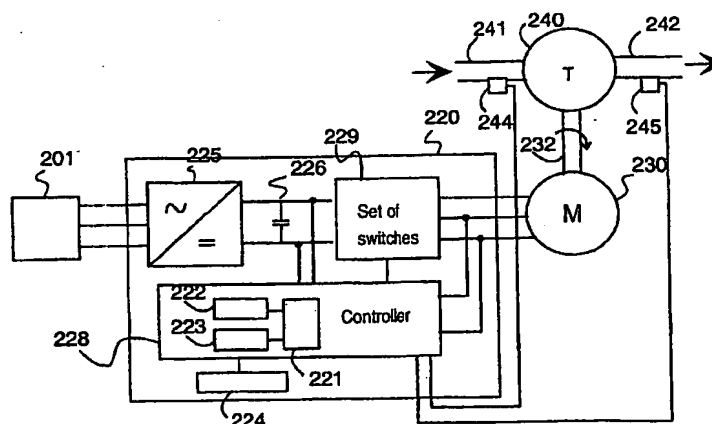
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

(72) Inventors; and

(75) Inventors/Applicants (for US only): **VENKATACHARI,**
Srikanth [IN/IN]; No. 41, (Old No. 21), Panchavati Swim-
ming Pool Extension, 3rd Cross, Malleswaram, Bangalore

[Continued on next page]

(54) Title: METHOD AND ARRANGEMENT FOR MEASURING INDIRECTLY WITH POWER, ROTATION SPEED AND
PUMP HEAD THE FLOW IN A PUMP



(57) Abstract: The invention relates to a method and an arrangement for measuring a liquid flow in connection with a pump system. The invention is preferably implemented in a pump system where the pump (240) is driven by an alternating-current motor (230), whose rotating speed is controlled by a control unit (220), such as a frequency converter, for instance. In accordance with the invention, the flow is determined without any direct flow measurement by utilising characteristic data of the pump and parameters that can be easily and reliably measured. Such parameters comprise the rotation speed of the pump, the liquid pressure and/or the motor power. Both the motor power and the rotation speed can be measured i.a. at the frequency converter (220). In addition, the static liquid pressure can be measured by means of a straightforward and reliable pressure sensor (244, 245), which can be integrated in the pump system. In implementing the invention, two characteristic curves of the pump can be advantageously used; flow as a function of power and flow as a function of pressure. This achieves high accuracy of measurement both with low and high flow values.

WO 2005/085772 A1



SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.